**NATURAL RESOURCES CONSERVATION SERVICE**

**CONSERVATION PRACTICE STANDARD**

# SEDIMENT BASIN

**(No.)**
**CODE 350**

## DEFINITION

A basin constructed to collect and store debris or sediment.

## PURPOSE

- Preserve the capacity of reservoirs, wetlands, ditches, canals, diversion, waterways, and streams
- Prevent undesirable deposition on bottom lands and developed areas
- Trap sediment originating from construction sites or other disturbed areas
- Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural waste solids, and other detritus

## CONDITIONS WHERE PRACTICE APPLIES

This practice applies where physical conditions or land ownership preclude treatment of a sediment source by the installation of erosion-control measures to keep soil and other material in place or where a sediment basin offers the most practical solution to the problem.

## CRITERIA

Sediment basin design and construction shall comply with all applicable federal, state and local laws and regulations.

The capacity of the sediment basin shall equal the volume of sediment expected to be trapped at the site during the planned useful life of the basin or the improvements it is designed to protect. If it is determined that periodic removal of sediment will be practicable, the capacity may be proportionately reduced. Where field data for sediment bulk density is not available, the designer can assume that one ton of sediment occupies one cubic yard.

The design of dams, spillways, and drainage facilities shall be according to NRCS Conservation Practice Standard 378 (Pond), Conservation Practice Standard 410 (Grade Stabilization Structure) or according to the requirements in NRCS TR-60 (Earth Dams and Reservoirs), as appropriate for the class and kind of structure being considered.

Temporary basins having drainage areas of 5 acres or less and a total embankment height of 5 feet or less may be designed according to NRCS Conservation Practice Standard 638 (Water and Sediment Control Basin).

All disturbed areas shall be treated as soon as possible after construction ends to control erosion and prevent excess sediment from leaving the site.

Provisions shall be made for dewatering sediment pools if necessary for safety and vector control.

Fencing and other safety measures shall be installed as necessary to protect the public.

Due consideration shall be given to good visual resource management.

**Basin Shape**. To get maximum trap efficiency, the reservoir length shall be at least 4 times the average width, unless calculations show that the proposed length is adequate to trap at least 65 percent of the suspended particles. Length is defined as the shortest distance from where particles enter the ponded area to the outlet leaving the pond. Idaho Appendix #10 to Chapter 10 of the Engineering Field Manual may be used to determine sediment basin dimensions where it is applicable. Where inlets are located other than the opposite end of the basin from the outlet, the minimum distance

between the inflow and outflow shall be no less than determined from Idaho Appendix #10.

**Conduits**. The minimum pipe size for sediment basins shall be 4 inch diameter pipe.

**Excavated Basins.** The sideslopes for excavated basins in silt loam soils shall be no steeper than 1/4 to 1 for basins depths of 4 feet or less and 1/2 to 1 for basin depths greater than 4 feet. Sideslopes in sandy soils shall be 2:1 or flatter.

Where sloughing or caving of the basin sides could endanger or cause failure to irrigation facilities, fences, roads, etc., sideslopes of basins in silt loam soils shall be no steeper than 1:1 for basin depths of 4 feet or less and 2:1 for basins greater than 4 feet in depth and in sandy soils 3:1 or flatter.

**Precipitation Runoff Areas**

**Design Capacity.** Sediment basins shall be designed to trap at least 65 percent of the sediment from a 10-year-24-hour storm on the contributing area. Erosion can be estimated using the Universal Soil Loss Equation (USLE) or Revised Universal Soil Loss equation (RUSLE) as appropriate when field measurements are not available. The sediment delivery ratio to the basin site and basin capacity can be determined using Idaho Appendix #10 to Chapter 10 of the Engineering Field Handbook.

**Irrigation Runoff Areas**

**Design Capacity.** Seasonal sediment yields can be made from one of the following methods: (1) Measured discharge and sediment concentrations during irrigations averaged throughout the irrigation season. Sediment measurements can be made using the modified Imhoff cone or filtering techniques (2) Estimate the sediment yield using Idaho Agronomy Technical Note 32 “Predicting Irrigation Induced Soil Loss on Surface Irrigated Cropland” for thecrop sequence producing the highest sediment yield: For basins with a 1 year interval for cleanout of sediment use, the crop with the highest soil loss. For basins with more than 1 year storage capacity can be designed for the crop sequence applicable to the years of storage.

**CONSIDERATIONS**

Large sediment basins may have an effect on the peak discharge rate from a watershed. Planners should consider this, and take steps to mitigate any potential negative effects this may have on riparian habitat downstream from the structure.

Visual aesthetics may be a concern, especially in urban or suburban areas. To address these concerns, the basin could be designed to blend with the surrounding topography, or plantings could be proposed to screen the view from surrounding homes or buildings.

The nesting success and survival rate of ground-nesting species will increase if mowing is delayed until after the nesting season during operation and maintenance operations.

Using native species for revegetation will increase habitat diversity.

**PLANS AND SPECIFICATIONS**

Plans and specifications for installing sediment basins shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The drawings and specifications shall show location, cross-section(s) of excavations and embankments, applicable piping and spillway details, applicable erosion controls for inlets or outlets, applicable seeding requirements and any special requirements for spoil disposal.

Provisions for controlling erosion and reducing sediment loss will be included. Specify rates of seed, mulch, and fertilizer, appropriate planting dates, and method(s) of establishment.

**OPERATION AND MAINTENANCE**

The sediment basin will be inspected after major storms for damage that may affect its function and performance. Any damage will be promptly repaired.

Typical O&M will include cleaning of pipe outlets, removal of sediment from basin, repair or filling of rills and eroded embankment fills, repair of any erosion in emergency spillway, maintenance of vegetation or other erosion measures. In sediment basins with liners, cleaning operations will need to avoid damage to the liner or the operations need to include the

necessary liner repairs. Trees and brush will be removed from embankments. Sediment removed from the basin will be placed and spread to prevent re-entry to the basin and streams. A written maintenance plan will be provided. Mow as need to maintain adequate vegetative cover and to prevent the establishment of undesirable species.

**REFERENCES**

- Engineering Field Handbook Chapter 10, Gully Treatment, Idaho Appendix # 10
- Idaho Agronomy Technical Note 32, "Predicting Irrigation Induced Soil Loss on Surface Irrigated Cropland"
- NRCS Conservation Practices

  Pond, Practice Code 378

  Grade Stabilization, Practice Code 410
- NRCS Engineering Technical Release, #60, "Earth Dams and Reservoirs"